

A new species of Thaumastellidae (Hemiptera: Pentatomoidea) from southern Africa

by

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Introduced by J. A. Slater

A second species, *Thaumastella namaquensis*, is added to the genus and family. Its morphology is compared briefly with that of *T. aradoides* Horvath, and the distribution and biology are discussed. The distribution of the genus represents a Mediterranean-southern African xeric one, and several other insect examples of such a distribution are given.

The pentatomoid family Thaumastellidae is of great interest because it appears in many respects to be very primitive in the Pentatomoidea (Stys, 1964; Schaefer, work in progress). The family has hitherto been represented by but a single species, *Thaumastella aradoides* Horvath. Another species of *Thaumastella* was discovered by Dr J. A. Slater (University of Connecticut) in the Transvaal Museum a few years ago, and additional specimens were collected by Dr M. H. Sweet (Texas A&M University). We are describing the new species here because it extends the range of the genus into southern Africa, thus providing a basis for interesting speculation on distribution, and also to provide a name for the species, which will be used by the senior author in a work on the higher classification of the Pentatomoidea.

The family placement of *Thaumastella* has been a matter of much confusion, and it is described by Stys (1964). Briefly, the genus was described by Horvath as a lygaeid of the subfamily Artheneinae in 1896. In 1960 Seidenstücker described its morphology briefly and erected for it a new subfamily, Thaumastellinae, still in the Lygaeidae. Almost simultaneously, and independently, in 1963, four people realized that the bug belonged in the Pentatomoidea: three of these accounts were published in 1964 (Schaefer, Stys, and Seidenstücker himself, correcting his 1960 family placement); the fourth was Dr P. D. Ashlock (University of Kansas), in a letter to the senior author. The most complete account was that of Stys (1964), who formally removed *Thaumastella* to the Pentatomoidea, erecting for it a new family, Thaumastellidae, near the Cydnidae. This is certainly the correct placement.

Thaumastella namaquensis spec. nov., figs 1, 2, 3, 4

All measurements are given in millimeters.

Body short, robust, sub-elliptical. Head, pronotum, scutellum, wing pads and abdomen bright red-brown, shining, a thin dark brown line on lateral margins of pro-

notum and abdomen; all appendages brownish yellow, the 5th antennal segment becoming testaceous. Head, pronotum, scutellum and wing pads shallowly punctate, punctures on scutellum and wing pads very large, conspicuous; sparsely clothed with semi-decumbent sericeous hairs.

Head porrect, moderately convex across vertex. Tylus extending to distal end of 1st antennal segment, eyes small, protrudant, set slightly away from anterolateral pronotal angles, ocelli absent. Length head 0,44, width 0,50, interocular space 0,30. Pronotum sub-quadrate, lateral margins sinuate, anterior "lobe" as wide as posterior "lobe", no transverse impression present, posterior margin nearly straight, very slightly concave. Length pronotum 0,44, width 0,66; length scutellum 0,26, width 0,44. Hemelytra reduced to trianguloid pads barely exceeding distal end of scutellum, clavus and corium completely fused, membrane absent, length wing pads 0,38. Length abdomen 1,10. Fore-femora moderately incrassate, mutic, ventral surface shallowly crenulate. Metathoracic scent gland auricle small, somewhat dorsal of mid-segment, rounded, projecting slightly from body surface. Abdominal pleuron with scattered short sharp spines becoming fewer mesally. Labium elongate, slightly exceeding hind coxae, 2nd segment reaching fore coxae; length labial segments I 0,16, II 0,26, III 0,30, IV 0,23. Antennae with segments 2 and 3 slightly clavate, 4 and 5 fusiform; length antennal segments I 0,14, II 0,16, III 0,30, IV 0,32, V 0,38. Total length 2,36.

Measurements of the holotype and the paratypes are given in Table 1, with the measurements of two specimens of *T. aradoides*.

HOLOTYPE. ♂ SOUTH WEST AFRICA: 10 miles N. of Vioolsdrift, Gt. Namaqualand, 13.ix.1950 (C. Koch, G. van Son). In Transvaal Museum.

PARATYPES. 4♂, 3♀, same data as holotype. In Transvaal Museum, C. W. Schaefer, and J. A. Slater collections.

3♂ SOUTH AFRICA: *Cape Province*, 1 mile east of Springbok. Elev. 3500'. 18-20.ix.1967. M. H. Sweet. In C. W. Schaefer, J. A. Slater, and M. H. Sweet collections.

There is very little variation in the paratype series. The females are larger than the males (Table 1), and some specimens are somewhat lighter than others in general body coloration, but all are very similar in most respects.

The two species of *Thaumastella*, *aradoides* and *namaquensis*, can most easily be distinguished by the lack of ocelli and greater labial length in the latter, and by the difference in pronotal shapes. We discuss these and other differences somewhat more fully below.

MORPHOLOGY

Most aspects of the morphology of *T. namaquensis* are similar to those of *T. aradoides* as described and figured by Seidenstücker (1960; 1964) and in more detail by Stys (1964). We shall reserve a more complete discussion of thaumastellid morphology, and its phylogenetic implications, for a study of the higher classification of the Pentatomoidea being prepared by the senior author.

The second tergum is large, with an oval area of very fine striae at the postero-lateral corner (fig. 3). There is a stout transverse ridge at the second-third tergal border; the ridge is subterminal to the anterior edge of the third tergum, and it bears laterally what may be a plectrum (fig. 2). This is a rounded knob, like the "lima" Stys described

TABLE 1. Measurements in mm of *Thaumastella namaquensis* spec. nov. and *T. aradoides* Horvath

<i>T. namaquensis</i>																				
Specimen Number	Sex	Head		Inter-ocular distance	Pronotum		Scutellum		Wing-pad length	Labial segments				Antennal segments					Abdomen Length	Total Length
		length	width		length	width	length	width		I	II	III	IV	I	II	III	IV	V		
1697†	male	0,44	0,50	0,30	0,44	0,66	0,26	0,44	0,38	0,16	0,26	0,30	0,23	0,14	0,16	0,30	0,32	0,38	1,10	2,36
1695	male	0,40	0,48	0,30	0,44	0,66	0,30	0,48	0,38	*	*	*	*	0,16	0,18	—	—	—	1,16	2,36
1696	female	0,48	0,55	0,34	0,46	0,78	0,36	0,56	0,42	0,24	0,42	0,40	0,30	0,16	0,22	0,38	0,42	0,44	1,42	2,80
1698	male	0,36	0,48	0,30	0,42	0,66	0,30	0,44	0,40	*	*	*	*	0,13	0,16	0,32	0,32	0,40	1,16	2,32
1699	female	0,44	0,52	0,32	0,46	0,72	0,26	0,44	0,40	*	*	*	*	0,16	0,18	0,36	0,34	0,38	1,30	2,60
1700	female	0,40	0,50	0,32	0,44	0,66	0,30	0,48	0,40	*	*	*	*	0,16	0,16	0,30	0,36	—	1,22	2,48
1701	male	0,42	0,50	0,32	0,46	0,66	—	—	0,38	*	*	*	*	0,16	0,16	0,32	0,35	—	1,20	2,32
—	male	0,44	0,50	0,32	0,44	0,66	0,30	0,44	0,38	0,15	0,30	0,30	0,26	0,16	0,16	0,30	0,33	0,39	1,16	2,34
1734	male	0,40	0,52	0,34	0,50	0,74	0,30	0,50	0,46	0,20	0,30	0,24	0,26	0,16	0,18	0,38	0,38	—	1,44	2,88
1735	male	0,46	0,54	0,34	0,44	0,74	0,30	0,50	0,44	0,20	0,28	0,24	0,24	0,16	0,16	0,32	0,38	—	1,30	2,56
1736	male	0,46	0,54	0,34	0,46	0,76	obscured	—	0,42	0,20	0,27	0,26	0,24	—	—	—	—	—	1,32	2,64
<i>T. aradoides</i> (two specimens, from the Sudan Republic)																				
1702	female	0,38	0,50	0,30	0,46	0,90	0,32	0,44	0,38	*	*	*	*	0,12	0,10	0,26	0,22	—	0,78	2,44
1703	female	0,40	0,51	0,32	0,42	0,90	0,38	0,48	0,36	*	*	*	*	0,12	0,11	0,26	—	—	0,80	2,44

† Holotype.

* These specimens are glued to points and their labial segments cannot be measured.

for *T. aradoides* (1964: 242 and fig. 4). If the plectrum here is homologous with that in *T. aradoides* (and we think it is), the strong thickening Stys describes for the second tergum is probably the ridge mentioned here, which appears to be a third-tergal antecosta; the region anterior to the ridge is the third-tergal acrotergite, to which the posterior edge of the second tergum is joined, bearing laterally the stridulitrum. In *T. aradoides* the stridulitrum is on the metathoracic wing. In the brachypterous *T. namaquensis* it is (of course) not. The similar placement and structure of the plectra in the two species indicate that

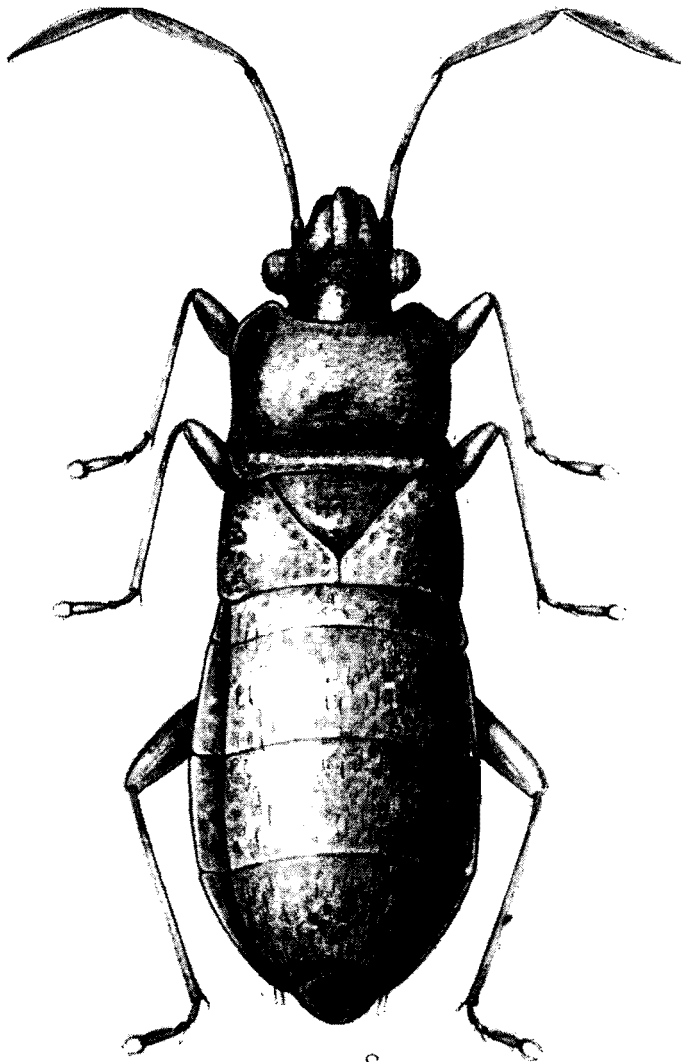


Fig. 1. *Thaumastella namaquensis* spec. nov., dorsal view.

they are homologous. The different positions of the stridulitra, however, suggest that this character may be a poor one for phylogenetic speculation: stridulitra occur in different positions in closely related groups, and in the same position in distantly related groups (Leston, 1957; Ashlock & Lattin, 1963).

The sixth and seventh terga are completely fused: there is no indication of a tergal suture (fig. 2). This is an advance over the condition in *aradoides*, where the suture is discernible laterally (Seidenstücker, 1960: fig. 7). There is also no medial circular area, as occurs in *aradoides*. Evidences of abdominal scent-gland openings are wholly lacking, another advance over the condition in *aradoides*, where Stys (1964) suggests some slight indication of their presence is to be found. Finally, there is no lateral sternal linear depression, such as Stys describes for *aradoides*.

There are a few minor differences in the male genitalia. The tip of the *namaquensis* paramere (fig. 4) is somewhat longer and more sharply bent than that of *aradoides*, and bears two proximal projections. And a low ridge ventral on the posterior face of the genital capsule extends to the lateral rim in *aradoides*, but ends short of it in *namaquensis*.

That part of the corium remaining in these brachypterous insects is not divided into an exo- and endocorium, as is the corium of *aradoides* (Stys, 1964). This state in *namaquensis* may represent the more primitive condition, but it and several other character-states by which *namaquensis* differs from *aradoides* may be correlated with the former species' brachyptery (*aradoides* being macropterous). These other differences are: the lack of ocelli in *namaquensis* (present in *aradoides*); and a striking difference in the shape of the pronotum, that of *aradoides* being distinctly narrowed anteriorly, that of *namaquensis* at least as wide anteriorly as it is across the humeri.

The orifice of the *namaquensis* metathoracic scent-gland is shorter than that of *aradoides*, where the auricle extends almost to the dorsal edge of the pleuron.

The labium of *namaquensis* surpasses the hind coxae, but that of *aradoides* extends only between the middle coxae.

DISTRIBUTION

Thaumastella aradoides is known from Algeria (Biskra), southern Iran (Djirott Anbar-Abad), Iraq (Baghdad), and the Sudan Republic (Hudaiba) (Seidenstücker 1960; 1964). The true locality of five specimens labelled "Saigon" is not known, as Stys (1964) remarks. We have not seen the labels, but it is possible that "Saigon" is a misreading of "Safwan" (Iraq, or the Trucial States); or of "Sagan," a river in Ethiopia; or "Sagana" in Kenya. Any good gazetteer will yield other possibilities.

The Transvaal Museum specimens of *T. namaquensis* are from Vioolsdrift, South West Africa, on the Orange River near the southern end of the Namib Desert, a very dry area (1.5 in. annual rainfall) with scant vegetation (Acocks, 1953: 111). The specimens collected by Dr M. H. Sweet are from near Springbok, Cape Province, about 75 miles south of Vioolsdrift and a little less dry (8–10 in. annual rainfall).

Moreau (1966), reviewing the past physiography of Africa, notes that the Namib and Botswana deserts have existed since the mid-Tertiary, and the Somali desert at least through the Pleistocene. It appears too that before the end of the mid-Pleistocene the Congo basin was at best semi-arid (pp. 50ff). Depending on the extent, north and south, of this Congo Basin aridity, it is possible that an arid and/or semi-arid belt existed from the Namib Desert on the Atlantic to Somaliland on the Indian Ocean. If so, *Thaumastella* may have lived from coast to coast, and the present African distribution of the genus (*aradoides* in the Sudan and *namaquensis* in South West Africa) may now be a

disjunct one, the two populations having become sufficiently different since the mid-Pleistocene to warrant specific status.

Thaumastella aradoides is more primitive than *namaquensis* with respect to several characters. The genus may have arisen in the arid regions south of the Mediterranean, whence it dispersed south to the Namib, and across the Sahara, less a barrier in the late Pleistocene and early Recent than it is today (Moreau, 1966: 53ff; Monod, 1963).

Other examples exist, scattered in the taxonomic literature, of xerophilous groups containing related members in the Mediterranean region and in southwestern Africa. One example, for which rather complete data are available, is the neuropteran family Nemopteridae.*

The more primitive nemopterid subfamily, Crocinae, contains 12 genera (13 if the Australian *Croce* is indeed a new one) and 35 species. Seven genera (24 species) extend from the southern Mediterranean east to northwestern India, and it is possible the Mediterranean region is the centre of several waves of dispersal.

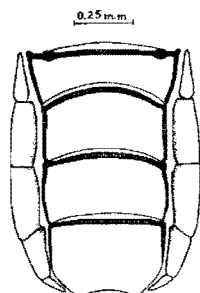


Fig. 2



Fig. 4

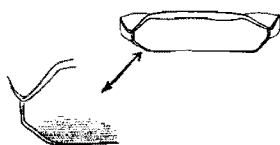


Fig. 3

Figs 2-4. *Thaumastella namaquensis* spec. nov. 2. Dorsum of abdomen, terga 3-7, inner view. 3. First and second terga, inner view. 4. Left paramere.

One such dispersal is of interest here. The genus *Croce* McLachlan is centred in the Mediterranean. Closely related is *Concroce* Tjeder, of the Cape Macchia. This may represent an ancient trans-African penetration. The other South African genus is *Laurhervasia* Navas, found in drier areas than *Concroce*, in the Cape Province and in South West Africa. *Laurhervasia* appears to be very close to *Concroce*, and one is probably derived

* This discussion is based upon the data of Tjeder (1967) and upon an unpublished analysis of those data by Dr J. A. Slater (University of Connecticut), to whom we are grateful.

from the other. This Mediterranean to southern Africa penetration may parallel the dispersal of *Thaumastella* as we have suggested it above.

If a dry region extended from the northwest Cape to the southern Mediterranean region, dispersal north as well as south might be expected. An example may be the distribution of the second nemopterid subfamily, the Nemopterinae. The South African component of this fauna comprises some 58% of the world species, with a high degree of endemism (Tjeder, 1967: 494). South Africa appears to be the centre of distribution, from which the world fauna was derived. Of that fauna, the Mediterranean-Oriental element is the next largest. These insects are xerophilous (Tjeder, 1967: 495-6), and they are therefore more common in the Cape Province and in South West Africa. The dispersal north from this centre occurred presumably through a dry region, such as the one we have suggested may explain the distribution of the Thaumastellidae.

Another example may be the genus *Camptocera* Jakovlev (Lygaeidae), which is superficially similar to *Thaumastella* and indeed has been collected with it (Seidenstücker, 1960; Stys, 1964). The recorded distribution of *Camptocera* is Mediterranean (Slater, 1964: 810-812). There are additional specimens (representing new species) in the J. A. Slater Collection from Lokoja (Kabba), Nigeria, and from Kimberly, R.S.A. Here again is a dry Mediterranean-Southern Africa distribution, like that of *Thaumastella*.

HABITAT AND BIOLOGY

The following notes are taken verbatim from a letter (November 1970) from Dr M. H. Sweet, Texas A&M University.

"Springbok is located among the low mountain ranges forming the western escarpment of the central Plateau. This area is delimited as the biotic Province of little Namaqualand. The low precipitation (8-10"/year) falls chiefly during the winter months. The low vegetation is correspondingly largely a karoo flora with some Cape elements. The period of major biotic activity is early spring when the desert flats burst into blooms for which Namaqualand is famous. The collecting site was a bouldery hillside with a sunny northwest exposure and a slope of about 20°. Kokerboom trees (*Aloe dichotoma* Masson) occurred on top of the hill. The perennial plants consisted primarily of succulent Euphorbiaceae and mesembryanthemum and at this time, many drying and dying ephemerals, mostly Compositae. Grasses were very infrequent and large areas of bare sandy soil were present. The lygaeid bugs *Nysius* and *Geocoris* were abundant and very active on the hot soil. A few *Spilostethus* nymphs were present along the shade of boulders. *Thaumastella* was found just underground in small chambers about 1" by 5" in soft sandy soil along the margin of a boulder. Five or six bugs were found together in a group and two were found singly. A further two hours' search at the location and several days' collecting in the area failed to turn up any more specimens, so the species seems to be scarce. Collected with *Thaumastella* in the same chamber were two specimens of *Lethaeus tartareus*. The thaumastellids were very lygaeid-like in their movements and were initially taken to be a *Plinthisus* or a small blissine.

"In the laboratory the thaumastellids spent most of the time hiding as a group under a flake of bark. The insects fed readily on sunflower, and peanut and some small seeds from the habitat, and grew fairly fat, swelling the abdominal conjunctiva. Although the insects lived for three months in the laboratory, no mating was observed and no eggs were laid. This suggests that the insects were in reproductive diapause and may have already completed their life cycle by mid-September."

ACKNOWLEDGEMENTS

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